

Advanced Composite Truss (ACT) Printing for Large Solar Array Structures, Phase I

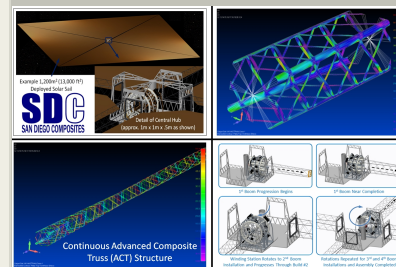
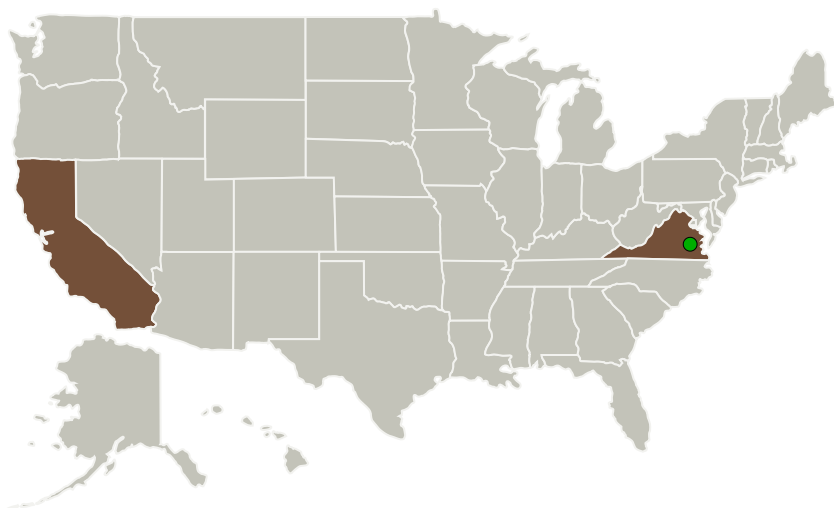
Completed Technology Project (2015 - 2015)



Project Introduction

San Diego Composites has developed a game-changing concept for the in-situ manufacture of advanced composite structures from aboard a spacecraft. This concept uses a combination of proven composite manufacturing processes, such as filament winding, pultrusion, and UV curing resins systems. The system has the capability to "print" advanced composite truss (ACT) structures from raw materials carried up during launch. This concept minimizes launch volume allowing for space for other mission-critical equipment, and allows for the deployment of much larger structures than the current state-of-the art. Deployed structures using SDC's continuous Advanced Composite Truss (ACT) printing system would be limited in length only by the ultimate structural capabilities of the material and truss structure. While the application addressed for this particular proposal deals with structures in the hundreds of feet, this concept could be extended to create structures in excess of 1000s of feet if tailored for a different given integration platforms. There are many advantages to this methodology. First of all, the entire produced structure is load carrying without fasteners, joints, or secondary materials. Secondly, high modulus fibers can be used as the primary load carrying material creating the efficient structure from a stiffness/weight perspective. Another advantage of the process is that it can be programmable for "printing" the optimized structures. Also, the structures are manufactured and cured in space after all of the high vibration loading associated with launch are over. SDC's continuous ACT printing method can also be integrated with the deployment strategy for a solar sail or array. This would maximize the use of the hardware and help to justify the light-weight machine.

Primary U.S. Work Locations and Key Partners



Advanced Composite Truss (ACT) Printing for Large Solar Array Structures, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Advanced Composite Truss (ACT) Printing for Large Solar Array Structures, Phase I

Completed Technology Project (2015 - 2015)



Organizations Performing Work	Role	Type	Location
San Diego Composites, Inc.	Lead Organization	Industry	San Diego, California
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

California	Virginia
------------	----------

Project Transitions

▶ **June 2015:** Project Start

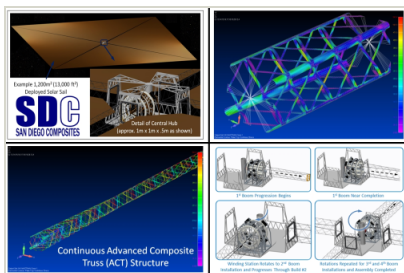
✓ **December 2015:** Closed out

Closeout Summary: Advanced Composite Truss (ACT) Printing for Large Solar Array Structures, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/138667>)

Images

**Briefing Chart Image**

Advanced Composite Truss (ACT)
Printing for Large Solar Array
Structures, Phase I
(<https://techport.nasa.gov/image/129126>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

San Diego Composites, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

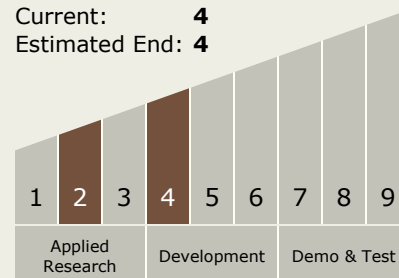
Carlos Torrez

Principal Investigator:

Quinn Mcallister

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



Advanced Composite Truss (ACT) Printing for Large Solar Array Structures, Phase I

Completed Technology Project (2015 - 2015)



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.4 Manufacturing
 - └ TX12.4.1 Manufacturing Processes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System